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3. "On the Algebraic Expression of the Number of Partitions of which a given number is susceptible." By Sir John F. W. Herschel, Bart., K.H., F.R.S. &c.

The object of this paper is to exemplify and extend the mode of analysis explained by the author in two former communications to the Royal Society "On the Development of Exponential Functions," and "On Circulating Functions," to a case in the theory of numbers in which they afford remarkable facilities, viz. that of the partitions of which a given number is susceptible. The separation of the symbols of operation from those of quantity, in the mode explained in the former of those communications, allows of the expression of the sums of certain series entering into this theory, under a form susceptible of resolution (by a theorem here given) into two portions, one of which, a rational function of the independent variable or number to be subdivided, expresses approximately, as a rational fraction, the number of partitions; the other, a periodic or circulating function, expresses the fraction, less than unity, by which the other portion differs from an exact integer number, and which, applied with its proper sign to that former portion, reduces it to an integer. In the mode of procedure here followed all subdivision into cases according to the numerical constitution of the number to be subdivided is avoided, and a uniform treatment is carried throughout.

May 30, 1850.

The EARL OF ROSSE, President, in the Chair.

Sir Benjamin C. Brodie, Bart., gave notice, that, at the next ordinary Meeting of the Society, he would propose the Right Honourable Lord Londesborough for election into the Society.

Mr Weld communicated the following particulars respecting the original model of the safety-lamp which was presented to the Society at this meeting by Joseph Hodgson, Esq., F.R.S.

In November 1815, Sir Humphry Davy read a paper before the Royal Society 'On the Fire damp of Coal Mines, and on Methods of lighting the Mines so as to prevent its Explosion.' In this communication he described a safe light, "which became *extinguished* when introduced into very explosive mixtures of fire-damp:" but as this fell short of the philosopher's wishes, he instituted a fresh series of experiments, which resulted in his invention of the safety-lamp described in a paper read before the Society in January 1816. "The invention," he says, "consists in covering or surrounding the flame of a lamp or candle by a wire sieve;" and he adds, "when a lighted lamp or candle screwed into a ring soldered to a cylinder of wire gauze, having no apertures except those of the gauze, is introduced into the most explosive mixture of carburetted hydrogen and air, the cylinder becomes filled with a bright flame, and this flame continues to burn as long as the mixture is explosive." The model in the possession of the Royal Society answers in every respect to